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ABSTRACT

A library of audiovisual instructional materials and curriculum guides were developed to train members of volunteer fire departments in LaPorte County, Indiana. The report briefly summarizes the project and includes a guide describing the audiovisual and instructional materials developed. The guide, containing 10 units, presents brief descriptions of each unit (which consists of a series of transparencies and an accompanying instructor guide). An illustration of one sample transparency from each unit is shown. The units are entitled Forcible Entry, Hose Layout Practices, Electrical Hazards and Fires, Transportation Fires, Company Officer Leadership, Overhauling Operation, Ventilation Practices, Fire Stream Practices, and Fireground Search and Rescue. (NJ)

FINAL REPORT

FIRE EDUCATION AND TRAINING - FEAT

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PROJECT NO. 59-75-D

A.K. Smith Area Career Center

Michigan City, Indiana, 46360

June 15, 1976

INFORMATION SHEET

A. Kind of Project: (check one)

1	___ Experimental	4	___ Demonstration
2	x Developmental	5	___ Evaluative
3	___ Pilot	6	___ Exemplary

B. Population

TYPE		NUMBERS (affected by project)
A	Disadvantaged	A _____
B	Handicapped	B _____
C	Migrant	C _____
D	Minority	D _____
E	Combination of the above	E _____
F	Other _____	F x

GROUP

1	Pre-school	1 _____
2	Elementary	2 _____
3	Junior High School	3 _____
4	Middle School	4 _____
5	Senior High School	5 _____
6	Postsecondary	6 _____
7	Adult	7 x
8	University	8 _____
9	Employer	9 _____
10	Employee	10 _____
11	Citizens	11 _____
12	Parents	12 _____
13	Combination of the above _____	13 _____

LOCALITY (check the one which encompasses the locality involved)

a	National	a _____
b	State	b _____
c	Region	c _____
d	District	d _____
e	County	e x
f	Area	f _____
g	Community	g _____
h	School Corporation (LEA)	h _____

III. STATEMENT OF OBJECTIVES:

To provide a library of instructional and audio-visual materials and develop a curriculum guide for the purpose of training members of volunteer fire departments in LaPorte County.

IV. STATEMENT OF PROBLEM:

No guidelines exist for the training of volunteer fireman. The purchase of instructional and audio-visual materials will provide the structure and content for uniform and more continuity in training program development.

V. Priority AREA:

Fire service training is of low priority in the state plan for vocational education, but a Purdue University survey released by the Department of Manpower Studies revealed that Indiana has approximately 22,000 fire fighters. Professor J.P. Lisak, director of the manpower office reports that Indiana has 900 relatively independent fire departments, and they range in size from 15 members to more than 1000. Slightly more than 50 departments are made up of paid personnel, with a total strength of about 4,000. The remaining departments are volunteer, consisting of about 18,000 men.
This means that Indiana is protected by a firefighting force made up of 81.8% volunteers.
At the present time, there are no official state standards for fire fighters, no specific proficiency levels on titles of fire fighters with related qualifications, no prescribed training programs and no state certification procedures for the recognition of fire fighters and their instructors.

VI. STRATEGIES:

Purchase and make available to volunteer fire departments in LaPorte County the needed instructional and audio-visual items to establish fire service training programs. Establish and maintain a central library of software (films, filmstrips, transparencies, etc.) relating to fire service training.

VII. ANALYSIS PROCEDURES:

This project did not involve any research. Therefore, no data needs to be analyzed. The project was based on a need for materials. These materials will provide, free of charge, useful instructional and audio-visual materials to increase the knowledge and efficiency of volunteer firefighters. Most of these materials are too expensive for individual departments to purchase.

VIII. FINDINGS:

The increasing importance of the volunteer fireman is becoming more evident now that the population is shifting from metropolitan areas to suburban areas. Many businesses and industries are also finding a suburban setting more attractive than a metropolitan area. This mobility of society and industry has created a serious problem of fire protection. These suburban areas, townships and areas that are on the fringe of metropolitan areas just usually depend on a volunteer fire fighting force for the protection of life and property. Volunteer firemen are just that. They are men who are employed full-time in jobs other than fire protection. The time and effort volunteers donate is a matter of civic pride and the desire to help their fellow man in time of need. The funds for equipment, facilities and adequate training programs are hard to come by. A good share of this money comes from fund-raising activities sponsored by the local firemen. These activities fall short of the money needed to develop and train an efficient fire fighting force. No source of training materials exist at county or area levels.

This has been a cooperative venture by the volunteer fire departments in LaPorte County to establish and maintain fire service training programs which will result in greater protection of lives and property for the people of LaPorte County.

IX. EVALUATION:

Data will be collected as to usage (which locals and materials). The Long Beach Volunteer Fire Department will provide follow-up studies and will assist other locals who have not taken full advantage of these materials to implement a training program utilizing the instructional and visual materials provided by this grant.

X. CONCLUSIONS AND RECOMMENDATIONS:

The objectives of FEAT have been met. Through the cooperation of the Indiana State Board of Vocational and Technical Education, the A. K. Smith Area Career Center, LaPorte County Council and the LaPorte County Fire Chiefs Association, LaPorte County now has a library of audio-visual materials with guides available for fire service training programs.

After the low level of funding for this project by the ISBVTE, the LaPorte County Fire Chiefs Association asked the LaPorte County Council to fund the balance for this project. After much delay, which caused the project to be behind schedule, the Council did fund the project.

Then, the State Board of Accounts would not permit the money going to the LaPorte County Fire Chiefs Association because they are only an association in name and do not have a constitution and by-laws. Funding was worked out and the project has been carried out as originally intended.

Minor changes were made in items #9, #10, &#11, of the original proposal. Original proposal called for the Long Beach Fire Department to provide the needed personnel, facilities and properties to reach the objectives of FEAT. At the request of the LaPorte County Council, these functions have been taken over by the LaPorte City Library.

In all, the goals and objectives of this project have been reached. Many of the local fire departments have used or are now establishing a formal training plan with the aid of the materials purchased through Fire Education and Training - Project FEAT.

RECOMMENDATIONS:

With the network of area career centers throughout Indiana, the ISBVTE and the State Fire Marshals Office should co-sponsor fire service training programs. The State Fire Marshals office could prescribe training programs, proficiency levels, standards and certification procedures for the recognition of fire fighters. Area career centers could provide the facilities and administrative functions to help make this program a statewide success.

FINANCIAL STATEMENT FOR FINAL REPORT ENDING June 16, 1976
(Date)

Project No., 59-75-D

ITEMS	Project Budget FY 1975		Total Expenditures on Project		End of Project Balance	
	Agency	Federal	Agency	State/ Federal	Agency	State/ Federal
A. DIRECT EXPENDITURES						
1. Personnel						
2. Contractual services						
3. Employee benefits						
4. Travel						
5. Supplies and materials	62.70	500	62.70	500	0	0
6. Communications (include phone calls, printing)		125		125.00		0
7. Properties (rentals or purchase of equipment)						
8. Facilities						
9. Product production and dissemination						
10. Project Evaluation						
B. INDIRECT EXPENDITURES						
C. TOTAL EXPENDITURES	62.70	625.00	62.70	625.00	0	* 0

Fiscal Agent/Director: Richard H. Cook

Institution/Agency Name: A. K. Smith Area Career Center

* Refund this amount to the State Board of Vocational and Technical Education

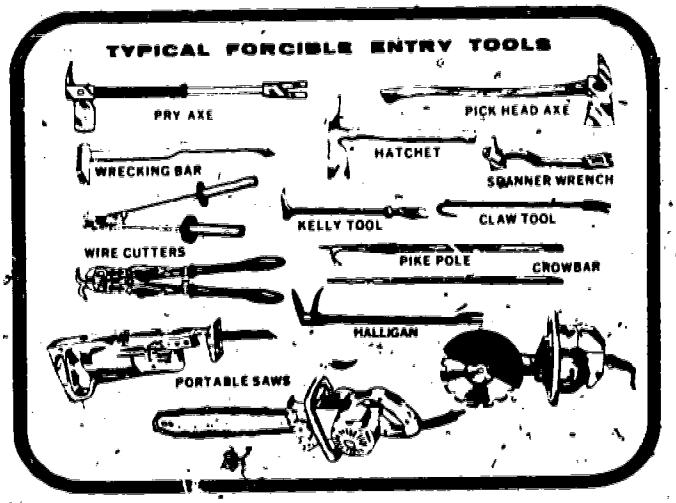
FIRE EDUCATION AND TRAINING - PROJECT F.E.A.T.

This program is a coordinated effort sponsored by the Indiana State Board of Vocational and Technical Education, the LaPorte County Council, and the A. K. Smith Area Career Center as part of the Michigan City Area Schools. The funds for this program has provided a library of audio-visual materials and curriculum guides for the purpose of training members of fire departments in LaPorte County both professional and volunteer.

The audio-visual materials will provide the structure and content for training program development. These materials are available, free of charge, from the LaPorte Public and County Library, 904 Indiana Avenue, LaPorte, Indiana.

TABLE OF CONTENT

Forcible Entry



TRANSPARENCY 1, BASE

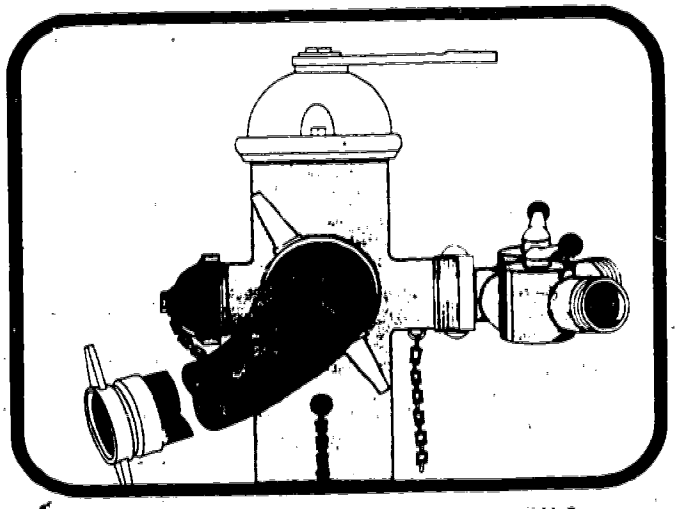
This series of 16 full color overhead transparencies is designed to introduce the Fire Service student to the types and uses of all the typical forcible entry tools. In presenting the various steps for using the forcible entry tools, great stress is placed on safety precautions for safeguarding Fire Service personnel.

The use of forcible entry tools for maximum results requires the firefighter to have a thorough understanding of the construction of the various types of structures. This series discusses in detail the various types of building construction the firefighter will encounter. Much attention is focused on key entry points into a building, the doors and windows. Forcible entry procedures are then discussed for each type of building, window or door.

— FORCIBLE ENTRY

1. Typical Forcible Entry Tools
2. Safe Way to Carry Axe
3. Building Construction
4. Opening Doors
5. Breaking Glass
6. Examples of Forcible Entry
7. Opening Overhead Garage Doors
8. Types of Windows
9. Opening Casement Windows
10. Opening Barred Windows
11. Roof Styles
12. Wood Roof Construction
13. Opening Wood Floors
14. Opening Walls
15. Pulling Ceiling
16. Forcible Entry

Hose Layout Practices



TRANSPARENCY 8, BASE PLUS OVERLAY 3

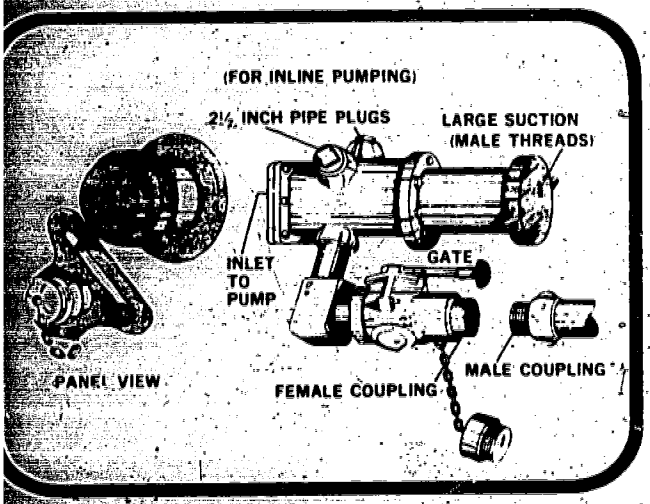
The first three transparencies illustrate basic hose layouts for supply and attack lines. They cover straight lays and reverse lays. The remainder of the course illustrates various hydrant hook-ups for achieving maximum water supply for deluge units and relay of water.

The transparencies were designed so that the instructor can indicate hose size, length, type and size of nozzle and many other operations pertaining to hose stretches by writing and drawing on the transparency with a marking pencil. Instructors can also utilize the transparencies for teaching simple hydraulics and "rule of thumb" applications. The Instructor's Guide explains each operation shown and gives many teaching hints for full utilization of the teaching aids.

— HOSE LAYOUT PRACTICES

1. Preconnected Attack Lines (Straight Lay)
2. Preconnected Attack Lines (Reverse Lay)
3. Attack Lines (Straight and Reverse Lay)
4. Supplying Fixed Deluge Pipe
5. Supplying Portable Deluge Pipe
6. Inline Pumping (A)
7. Inline Pumping (B)
8. Hydrant Connections

Fire Pumps



TRANSPARENCY 5, BASE

ECTION 1 – FIRE PUMPS

he operation and care of the fire department pump is the sponsibility of the pump operator. To enable him to operate ficiently, he should have a good understanding of its con- uction and working principles. The primary objectives of ese transparencies on pump theory are: (1) to teach the eory on which fire department pumps operate, (2) familiarize e pump operator with fire department pump construction,) show the relation of fire department accessories to the pump oper, (4) develop ability to recognize mechanical failures in e pump, and (5) illustrate the height the pump can lift ater.

detailed Instructor's Guide complete with background ma- rial and valuable suggestions for the instructor is included.

1. Principles of: Single Stage Piston Pump, Rotary Gear and Rotary Vane Pumps
2. Centrifugal Pump Diagram
3. Centrifugal Pump Impellers
4. Principle of Centrifugal Pump (Two Stages)
5. Gated Inlet
6. Simple Gauge and Compound Gauge
7. Gate Discharge Gauges
8. Receiving Water Under Pressure
9. Water Supply: Drafting and Booster Tank
10. Principle of Priming Device
11. Automatic Relief Valve
12. Principle of Governor
13. Gauge Readings PSI
14. Lifting Water (Drafting)

continued next page

SECTION 2 – SIMPLIFIED FIREGROUND PUMP OPERATIONS

The demands of a working fire prevent pump operators from taking time to calculate mathematically each requirement for water pressure to supply attack lines. However, it is essential that pump operators be able to calculate these pressure requirements rapidly and with a fair degree of accuracy to assure adequate fire streams. The objective of this section of transparencies for overhead projectors is to teach pump operators simplified methods for determining pressure requirements.

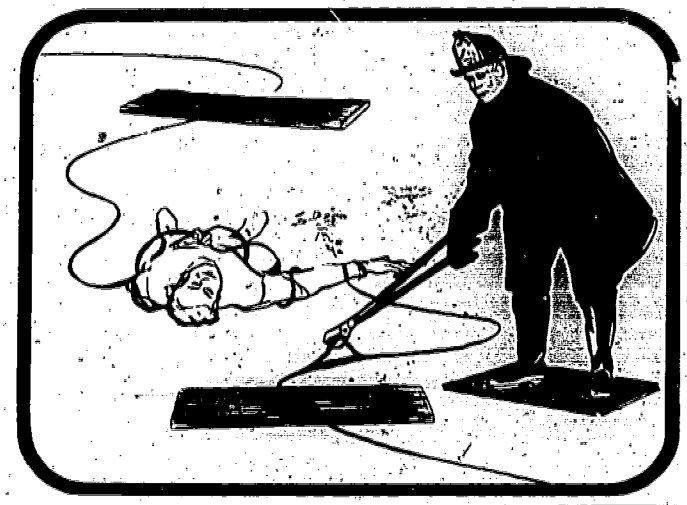
The transparencies illustrate supply problems for booster lines, 1 1/2 and 2 1/2 inch lines, pre-connected lines, siamesed lines, deluge sets, and relay pumping. Transparencies for calculating water supply from the pumper to standpipe and automatic sprinkler systems are also a part of the course.

Wherever possible the transparencies have been designed to give the instructor flexibility in using them. By writing on the transparencies to indicate the hose size, hose length and nozzle tip being employed, the instructor can set up almost every conceivable fireground problem. The use of overlays throughout the course further enhances the teaching value of the transparencies.

The entire course consists of 9 transparencies with 8 overlays. The Instructor's Guide included with the course provides all the simplified mathematics required for teaching the course. The "rule of thumb" methods for determining friction loss and pressure requirements are emphasized in the guide and the instructor is given methods for using the transparencies to achieve their maximum teaching value.

1. Pre-Connected Booster Lines
2. Pre-Connected Lines
3. Wyed Lines
4. Supplying a Standpipe
5. Supplying a Sprinkler System
6. Relay Pumping
7. Supplying a Deluge Set
8. Parallel Lines
9. Limitations in Moving Water

Electrical Hazards & Fires



TRANSPARENCY 6, BASE PLUS OVERLAY 1 AND 2

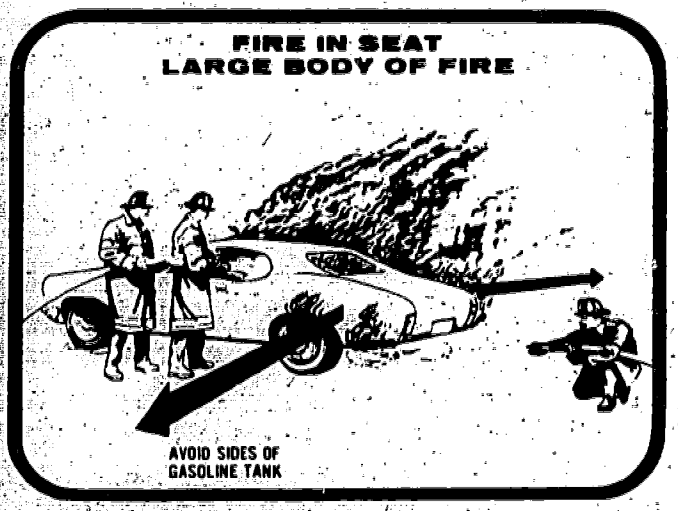
These 12 full color overhead transparencies cover in detail outdoor electrical emergencies. They are designed to teach firefighters to cope with these emergencies. These transparencies stress action firefighters should take to afford maximum protection for themselves, the victim and equipment.

The transparencies cover basic electrical terminology, recommended safety precautions for downed wires, removal of victim in contact with wires, high tension tools and their utilization. A detailed Instructor's Guide with background material and suggestions for the instructor is included with each unit.

UNIT 9 — ELECTRICAL HAZARDS AND FIRES

1. Volts, Amperes and Ohms
2. Notify Power Company
3. Safety Precautions
4. Testing Rubber Gloves
5. Grounded and Ungrounded Wires
6. Removing Wire From Victim (Wire Cutters)
7. Removal of Wire From Automobile (Weighted Rope)
8. Taking Victim Off Wire (A)
9. Taking Victim Off Wire (B)
10. High Tension Rescue Tools
11. Rescue and Attack (Automobile)
12. Meter Removal

Transportation Fires



TRANSPARENCY 4, BASE PLUS OVERLAY 1

SECTION 1 — AUTOMOBILE FIRES

The section on Automobile Fires illustrates and discusses fire as it is found in different locations throughout a typical passenger car. For example, the section covers engine fires, fires in the rear seat, and fires in the trunk and seat. This series stresses safety throughout, and safety procedures which should be followed are set forth in detail.

1. Engine Fire (Hood Closed)
2. Engine Fire (Hood Open)
3. Interior Fire Rear Seat
4. Fire in Seat (Large Body of Fire)
5. Fire in Trunk and Seat
6. Overhauling
7. Wheel Fire
8. Safety Hints
9. Attack Path
10. Rescue
11. Limited Access Highway (A)
12. Limited Access Highway (B)

SECTION 2 — GASOLINE TANK TRUCK FIRES

The section on Gasoline Tank Truck Fires is devoted to the theory and techniques used in the control of tank truck fire emergencies. The tactics and techniques to be used in any tank truck fire emergency will depend upon the existing conditions. As is found in many fire situations, it is of the utmost importance that these conditions be quickly and accurately determined in the size-up. Many questions have to be answered as an effective plan of attack is formulated. This series is designed to equip the fire service student with the information he will need to answer those questions when he is faced with a tank truck emergency.

1. Vapor Pressure
2. Characteristics of Gasoline
3. Gasoline Tank Truck Construction
4. Typical Hatch Cover
5. Relief Vent
6. Vapor Pressure and Reaction
7. Principles of Attack (1)
8. Principles of Attack (2)
9. Attack Procedures
10. Attack Procedures
11. Roll-Over Fires
12. Gasoline Spills
13. Off Loading
14. Rescue Path
15. No Title (Instructor's Work Slide)

SECTION 3 — AIRCRASH FIRE FIGHTING AND RESCUE

The section on Aircrash Fire Fighting and Rescue consists of 16 transparencies with 22 overlays designed specifically for teaching fire fighting and rescue practices when the crash has occurred outside the airport. It emphasizes the use of standard fire apparatus for attack, since specialized aircrash apparatus may not be available for deployment to the crash scene. The visuals illustrate various types of aircraft, differing types of crashes, initial approach of apparatus, and attack and rescue paths and procedures. Several of the transparencies illustrate downed aircraft in wooded, mountainous, and farmland areas. Crashes into water and into populated areas are also shown. In addition, the course deals with special problems of the military which concern fire fighters, as well as escape routes and points of forcible entry for passenger aircraft.

Each of the transparencies is designed to allow complete flexibility for the instructor. The instructor can draw on the transparency to show apparatus positions and attack lines, or he can involve the students in problem solving.

1. Aircraft Types
2. Helicopter
3. Belly Landing
4. Cartwheel Crash
5. Nosedive Crash
6. Water Crash
7. Approaching the Downed Aircraft
8. Aircraft Structure/Forcible Entry/Escape Routes
9. Attack Procedures
10. Fuel Spill (Soft/Hard Surfaces)
11. Crashes in Populated Areas
12. Crashes into Wooded and Farm Areas
13. Crash in an Outlying Area
14. Mountainside Crash in a Remote Area
15. Military Aircraft
16. Seat Ejection System

Company Officer Leadership

For the first time, fire service instructors can have a professional visual aid program for leadership training. Designed specifically for the fire service, these vivid, colorful visuals dramatize real-life situations which occur every day in your department.

The first three sections introduce the trainee to the principles of good leadership, showing how common errors can be overcome and corrected. Sections four through six cover topics vital to the fire service: public relations, planning, and discipline and moral. A concluding section shows the officer trainee the important principles of organization and management.

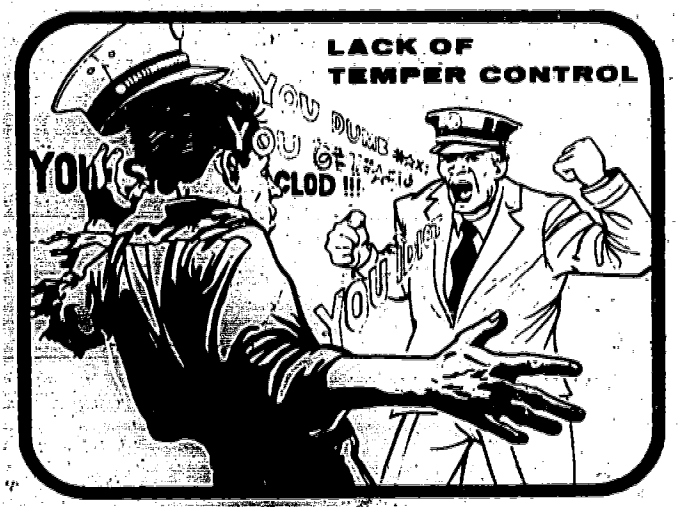
Because of its instantaneous visual impact and lively, yet down-to-earth approach, the program encourages class discussion and immeasurably increases the trainee's understanding of leadership principles. The program is also ideal for refresher courses.

TRANSPARENCY 4, BASE
What can happen when an officer fails to lead.

SECTION 1 — LEADERSHIP—DEFINITIONS, STYLES, TRAITS

1. Leadership Defined (A)
2. Leadership Defined (B)
3. Leadership Styles (Autocratic)
4. Leadership Styles (Free Rein)
5. Leadership Styles (Democratic)
6. Which Best Suits You ?
7. Know Yourself
8. Know Your Men
9. Leadership Traits - Personality
10. Leadership Traits - Professional Competence
11. Leadership Traits - Human Understanding (A)
12. Leadership Traits - Human Understanding (B)

New sections!



TRANSPARENCY 7, BASE

Negative personnel reactions to an officer's display of temper.

SECTION 2 – COMMON LEADERSHIP ERRORS

1. One Man Band—Failure to Delegate
2. Pulling Rank
3. Reprimanding
4. Clean Sweep
5. Failure to Get the Facts
6. Failure to Maintain Records
7. Lack of Temper Control
8. Promises
9. Buck Passing
10. Do-Nothing Approach

SECTION 3 – AIDS TO EFFECTIVE LEADERSHIP

1. Planning
2. Training
3. Discipline
4. Morale
5. Evaluations
6. Public Relations
7. Orders
8. The Three F's—FAIR
9. The Three F's—FIRM
10. The Three F's—FRIENDLY
11. The Nature of Leadership

TRANSPARENCY 2, BASE PLUS OVERLAY 1

Benefits of good public relations

SECTION 4 – PUBLIC RELATIONS

One abusive word to a distraught home-owner; one car cut off by a "hot rod" engine company driver; one valuable antique needlessly ruined because it was left uncovered after a fire: such discourtesies can ruin the public image of even a well-led and well-run fire department. This section helps train company officers to be constantly aware of the activities and courtesies that can help establish and maintain public trust; and to work toward keeping the lines of communication open between the public and the fire service.

1. Why Public Relations?
2. Benefits: Community and Fire Service
3. Information Avenues--"Mass Media"
4. Face to Face Contacts
5. Public Images of Firefighters
6. Firefighter Images--Super Hero
7. Informing the Public
8. Firefighting Images--What the Public Should Know
9. Public Relations at Work--Personnel Appearance
10. Destructive Public Relations--Discourteous
11. Public Relations at Work--The Telephone
12. Public Relations at Work--Abusive Language
13. Public Relations at Work--Using Salvage Covers
14. Responding to Emergencies
15. Returning to Quarters
16. Highway Courtesy

continued next page

Company Officer Leadership (cont')

TRANSPARENCY 1: BASE
Planning – a function of leadership

SECTION 5 – PLANNING

Good leadership means good planning. Section five helps teach the trainee how to plan work schedules, inspection programs, and job assignments. It also shows how he can plan his own work load to make the most efficient use of his time. In addition, it helps him evaluate his own performance by showing the signs and effects of poor planning.

1. Planning--A Function of Leadership
2. Suggestions for Daily Job Planning
3. Work Schedule and Inspection Plan
4. Rotate Job Assignments
5. Follow-up at Day's End
6. Allow Time for Training
7. Allow Time for Communications
8. Allow Time for Paperwork
9. Allow Time for Emergencies
10. Aids to Planning
11. Signals of Poor Planning
12. More Signals of Poor Planning

SECTION 6 – DISCIPLINE AND MORALE

Reprimands, demotions, suspensions--these are among the most difficult duties of the company officer. Exploring the psychological aspects of good leadership, this section shows the trainee how discipline can be administered fairly, in a way that encourages the respect of his men and maintains company morale.

1. Negative Discipline
2. Positive Discipline
3. The Written Reprimand
4. Suspension--Demotion
5. De-Hiring Process
6. Transfer
7. Morale--Handle With Care
8. The Company Officer's Role

SECTION 7 – BASIC PRINCIPLES OF ORGANIZATION AND MANAGEMENT

The final section shows the principles of personnel management and administration. The visuals illustrate such concepts as chain and unity of command, and the span of personnel control as it relates to people, distance, and time. In addition, section seven suggests ways of preventing and heading-off grievances, and shows how to evaluate a fire fighter's performance.

1. Line and Staff Organization
2. Chain of Command
3. Unity of Command
4. Span of Control--People
5. Span of Control--Distance
6. Span of Control--Time
7. Prevention of Grievances
8. Prevention of Grievances--Head Them Off
9. Budgeting Process
10. Firefighter Evaluation

Overhauling Operations

TRANSPARENCY 20, BASE

This complete visual program can help increase your department's efficiency, while lowering the high injury rate associated with overhauling.

Overhauling Operations is the first visual training program to bring together every aspect of this important and complicated fire fighting operation. It not only covers the general procedures involved in planning, checking for structural stability, and coordinating personnel, but also vividly illustrates specific techniques for locating channels of fire travel, properly opening walls, and extinguishing the fire – without injury to fire fighters.

Stressing that overhauling is not an emergency procedure, but one which must be performed carefully, Unit 21 demonstrates how to solve problems posed by exterior and interior building designs, and shows how fire fighters overhaul building contents with a minimum of damage. It features multiple overlays which help explain structural components, and a guide to help the instructor prepare and execute his presentations.

– OVERHAULING OPERATIONS

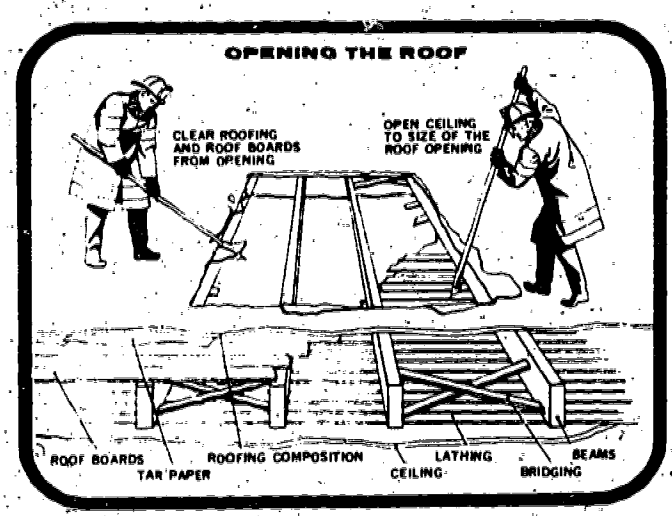
1. Planning Overhaul Operations
2. Determining Stability of Building (Residential)
3. Determining Stability of Building (Commercial)
4. Utility Service Installations
5. Searching for a Cause of the Fire
6. Using the Senses
7. Personal Safety
8. Lighting the Area
9. Supervision for Safety

continued next page

(cont')

10. Fire Travel Danger Points (Residential)
11. Fire Travel Danger Points (Commercial)
12. Roof Operations (Flat Roof)
13. Roof Operations (Pitched Roof)
14. Signs of Fire Travel
15. Interior Fire Travel
16. Fire Travel Through Walls and Floors
17. Fire Travel Through Shafts
18. Fire Travel Along Pipes and Electrical Lines
19. Searching for Hidden Fire
20. Opening Walls Around Doors and Windows
21. Opening Walls, Floors, and Ceilings
22. Checking for Extension of Fire
23. Dropped Ceiling Construction
24. Overhauling Contents (A)
25. Overhauling Contents (B)
26. Overhauling Contents (C)
27. Restoring and Protecting the Premises
28. Securing the Premises

Ventilation Practices

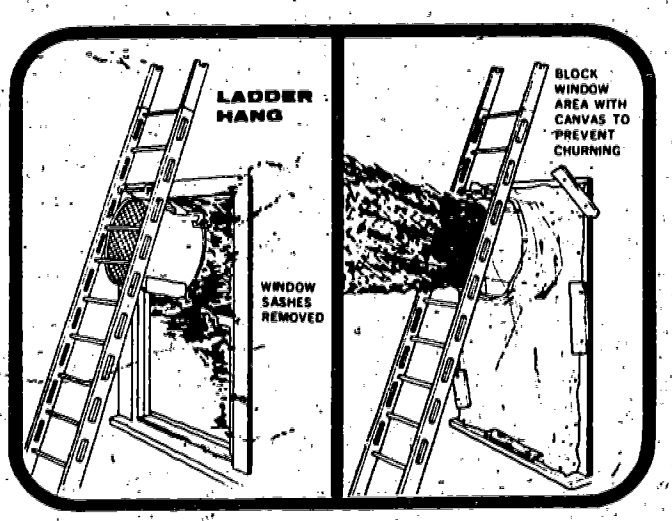


TRANSPARENCY 17, BASE PLUS OVERLAY 2

SECTION 1 – THEORY AND PRACTICE

The section on Theory and Practice defines and illustrates what is meant by Ventilation, Mushrooming and Backdraft. A complete understanding of each of the above phenomenon is critical in attacking a fire situation. The methods and techniques of vertical and horizontal ventilation are explained and illustrated in depth. One important feature of this series is the addition of "work slides" which allow the instructor to design his own fire situations in structures characteristic of the local area.

1. Selected Channel
2. Characteristics of Combustion
3. Mushrooming Effect
4. Stages of Fire
5. A Potential Bomb
6. Horizontal and Vertical Ventilation
7. Vertical and Horizontal Ventilation (Combined)
8. Ventilation Assisted by Fog Stream/Power Fan
9. Blind Spaces
10. Structural Fire Travel
11. Self-Vented Fire
12. Exposures
13. Establishing Ventilation Flow
14. Venting a Peaked Roof
15. Window Venting
16. Roof Openings
17. Opening the Roof
18. Methods for Venting Windows
19. Ventilation of Blind Space
20. Primary Reasons and Objectives for Ventilation
21. Ventilation Sequence (Work Slide)
22. Size-Up (Work Slide)
23. Basement Ventilation (Work Slide)



TRANSPARENCY 8, BASE

SECTION 2 – MECHANICAL VENTILATION (Power Fans)

Natural ventilation will not eliminate all the smoke and fumes from a building at all times. When a fire has been controlled the area can be ventilated further with the aid of smoke ejectors or exhaust fans. If mechanical ventilation is used improperly it can do more harm than good. Therefore, this section on Mechanical Ventilation explains the principles and illustrates the proper placement of mechanical ventilators in all standard fire situations.

1. Door Installation
2. Archway Installation
3. Window Placement
4. Floor Opening Placement
5. Window Well Placement
6. Ladder Hang (Stairways)
7. Dead Space Ventilation
8. Ladder Hang
9. Stacked Units
10. Protecting Exposures

Unit 4: Fire Stream Practices

Water has always been the most commonly used agent for extinguishing fires. Modern methods for water application make firefighting more effective and require advanced knowledge and skills. The firefighter must be thoroughly familiar with the fire hose, the pump and the nozzle design.

This series of 76 transparencies with 93 overlays is designed to acquaint the firefighter with the laws of physics and the procedures necessary to produce the most effective fire stream for the many types of fires he will encounter. All the principles and variables coincident to the production of a fire stream are covered in detail. Quick, easy-to-remember "rules of thumb" for calculating flow and friction loss are also set out for the student's consideration.

FIRE STREAM PRACTICES

SECTION I – INTRODUCTION TO FIRE STREAMS

1. Water to Extinguish Fires
2. Definition and Purpose of Fire Streams
3. Composition of Water
4. The Law of Heat Flow
5. The Law of Specific Heat
6. Latent Heat of Vaporization
7. Effectiveness of Water
8. Water Converted to Steam
9. Water
10. Fire Stream Requirements
11. Phases of Burning
12. Unconfined Fire
13. Requirements for Extinguishment of Flammable Liquid Fires
14. Requirements of Fires Involving Energized Electrical Equipment
15. Principles of Pressure – First Principle
16. Principles of Pressure – Second Principle
17. Principles of Pressure – Third Principle
18. Principles of Pressure – Fourth Principle
19. Principles of Pressure – Fifth Principle
20. Principles of Pressure – Sixth Principle
21. Kinds of Pressure
22. Derivation of PSI
23. Friction Loss
24. Friction Loss
25. Friction Loss
26. Pressure Elevation
27. Water Hammer
28. Effective Reach of a Solid Stream

SECTION II – PRODUCING OR DEVELOPING FIRE STREAMS

1. Formula Symbols and Area of a Circle
2. Nozzle Pressure and Water Flow
3. Finding the Capacity of a Tank in Gallons
4. Formula for Obtaining Nozzle or Engine Pressure (Approximate)
5. Problem on Use of Formula (K Factor)
6. Computing Water Flow in Gallons per Minute
7. Calculating Fire Streams
8. Finding Gallons Per Minute and Friction Loss
9. Pressure Loss Due to Elevation
10. Conversion Factor Chart
11. Factor Problems – Large and Small Lines
12. Supplying More Than One Hose Line
13. Wyed 1-1/2-Inch Lines and Preconnected Hose
14. Working With 3-Inch Hose
15. Siamesed Lines
16. What Size Suction Hose?
17. Condensed Formula For 3-Inch Hose With 2-1/2-Inch Couplings
18. Rule of Thumb For Flow and Friction Loss in Hand Lines and Master Streams

19A. Rule of Thumb – Calculating Friction Loss by GPM Flowing

19B. Rule of Thumb – Calculating Friction Loss by GPM Flowing

20. Rule of Thumb – Calculating Friction Loss by GPM Flowing
21. Producing Master Streams
22. Rule of Thumb (Master Streams)
23. Master Stream Problems
24. Master Streams and Elevation
25. Relaying Water
26. Spacing Pumpers in Relay Operation
27. Relay Pumping Problems
28. Supplying Private Fire Protection

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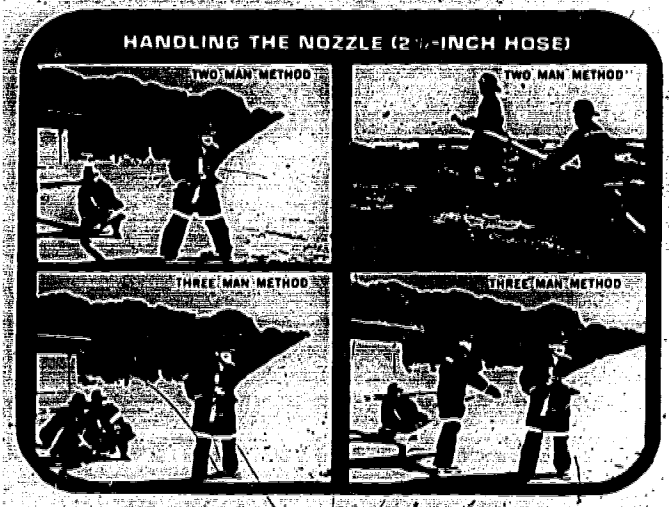

TRANSPARENCY 6, BASE PLUS OVERLAY 1

SECTION III – SELECTION AND APPLICATION OF FIRE STREAMS

1. Selecting the Fire Stream
2. Propagation of Fire
3. Water Application
4. Handling the Nozzle
5. Handling the Nozzle (1-1/2-Inch Hose – One- and Two-Man Methods)
6. Handling the Nozzle (2-1/2-Inch Hose – Two- and Three-Man Methods)
7. Advancing the Nozzle
8. Water Fog for Ventilation
9. Ventilation and the Use of Water Fog
10. Applying Solid Streams From Hand Lines

SECTION IV – RELATED INFORMATION (APPENDIX)

1. Mechanical Principles of Solid Stream Nozzles
2. Mechanical Principles of Fog Stream Nozzles
3. Phases of Burning
4. Computing Available Water in a Specified Area
5. Scale for Computing Available Water
6. Water Flow Test Summary Sheet
7. Selection of Hydrants for Flow Test
8. Use of Pitot Tube and Gauge
9. Available Water
10. Discharge Table for Circular Outlets

New!

Fireground Search and Rescue

TRANSPARENCY 18, BASE

Stressing the systematic location of victims, *Search and Rescue* helps show your men how time of day affects occupancy patterns, how to locate victims in different types of buildings and rooms, how to establish efficient and safe search patterns, and how to perform searches with a team.

In addition, it shows how to vent and isolate the fire as the search operation proceeds, and illustrates the importance of checking interior and exterior exposures. A "work" visual is included to help the instructor set up special search and rescue problems.

FIREGROUND SEARCH & RESCUE

1. Information Received at Time of Alarm
2. Time of Day Related to Occupancy
3. Single/Two Family Dwellings
4. Multiple Dwelling (Occupancy) Problems
5. Starting the Search
6. Search Pattern (A)
7. Search Pattern (B)
8. Search Pattern--Turn Sequence
9. Conducting Thorough Search of Area
10. Instructor's Work Transparency
11. Venting
12. Isolating Fire
13. Identifying Searched Room
14. Victim Blocking Door
15. Key Search Locations
16. Checking Key Locations For Victims
17. Detailed Search
18. Search and Vent (Poor Visibility)
19. Checking Interior and Exterior Exposures
20. Communications